Maine Department of
Environmental Protection

Toxics and Hazardous Waste Reduction
Pollution Prevention (P2) Planning Guidebook

January 2003

Foreword

Maine seeks to reduce the amount of toxics used, toxics released and hazardous waste generated in the environment. P. L. 1999, c. 348 "An Act to Encourage Continuous Improvement in Pollution Prevention in Maine" requires certain Maine businesses to reduce their toxics used, toxics released, and hazardous waste generated. This law includes an amendment in 2001 P. L. 2001, c. 212, “An Act to Amend Certain Laws Administered by the Department of Environmental Protection”.

This guide summarizes and clarifies the facility requirements of the Toxics and Hazardous Waste Reduction Program. The guide is organized to follow the regulatory requirements in the order they appear in the Toxics Law. A complete copy of the most recent amended law is included in Appendix A.

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Chapter 1: Introduction to Maine's Toxics Use and Hazardous Waste Reduction Law (Toxics Law).

1.1 Summary of the Toxics Law

The Toxics Law encourages Maine businesses to reduce toxics use, toxics release, and hazardous waste generation. Under the law, those businesses that are part of the regulated community must:

1. Develop a Pollution Prevention (P2) plan;
2. Solicit employee input during the plan development;
3. Set specific company reduction goals;
4. Report biennially to the DEP's Toxics Program and local municipal officials on their progress toward meeting the reduction goals;
5. Pay annual fee(s) to DEP's Toxics Program.

The law specifies non-binding statewide reduction goals for toxics use, toxics release and hazardous waste generation. The goals are:

Goals	**2002**	**2004**	**2006**
Toxics Use (Reductions are defined relative to 1990 levels).	40%	50%	60%
Toxics Release (Reductions are measured against the "average" amount released in 1990-1991).	40%	50%	60%
Hazardous Waste (Reductions are measured against an "average" manifested amount for 1987 and 1989).	40%	50%	60%

In addition, the Toxics Law requires state owned facilities to develop an environmental performance system, including a pollution prevention system for state owned facilities, and requires the DEP to complete a variety of actions to implement the law.

1.2 Benefits of a Toxics and Hazardous Waste Reduction Program

There are many reasons a company should pursue a reduction program. The reduction or elimination of toxics and hazardous waste makes clear sense from the point of view of worker safety, public health and environmental protection. Improvement of a company's image in the eyes of its workers, community, and customers can also be a benefit. Less obvious perhaps is the positive bottom-line impact a successful reduction program can have. A company can:

- **Reduce operating costs by using less raw material and conserving energy;**
- **Reduce transportation, storage and disposal costs of waste;**
- **Reduce potential liabilities and cut insurance costs;**
- **Reduce the need for pollution control equipment and monitoring;**
- **Lower costs for regulatory compliance;**
- **Create a healthier work environment and community by reducing exposure to hazardous input materials and releases;**
- **Improve its public image;**
- **Open new market opportunities based on reformulated processes, products and/or services.**

Some examples of Maine companies that have greatly reduced toxics and hazardous waste and saved money while initiating a reduction program are given below:

- Bath Iron Works (BIW), installed "in-process" silver recovery units on several of their photographic developers at 2 of their facilities. As a result of those projects, they reduced photographic wastes by 73% and eliminated 10,890 pounds of hazardous waste per year at the Bath facility, and reduced photographic wastes by 50% and eliminated 700 pounds of hazardous waste from their East Brunswick facility.

- International Paper Co. (IP), implemented a Predictive Emission Monitor System (PEMS) at their Androscoggin Mill. IP can now predict potential emission problems before exceeding their license limit, allowing proactive corrective actions and continuous monitoring of emission rates. By implementing the PEMS on the lime kiln, IP recorded an emission rate of 15.64 lb./hr, a 9.86 lb./hr (43.2 tons/year) reduction in emissions.

- Pratt & Whitney (P&W), undertook a significant energy conservation effort to reduce environmental impact, reduce costs and create a better working environment for employees. In the 2 years it took to implement the changes, P&W reduced electrical consumption by 18.2%, natural gas by 48.2%, and #6 fuel oil by 33.3%. P&W reduced its air emissions of CO by 32,419,196 lbs./yr., SOx by 238,784 lbs./yr. and NOx by 104,427 lbs./yr. P&W now saves $840,000 per year and has greatly reduced their regulatory requirements.

Success stories like these abound and more appear in print each day. These companies have taken advantage of, and benefited from, the positive link between economic development and environmental protection. By *preventing* pollution rather than paying to manage and control it, they have enhanced their competitiveness in the marketplace, improved their workplace and helped the environment. Additional case studies can be found on the DEP's pollution prevention web page at: http://www.state.me.us/dep/oia/case/

One small success, such as the identification of a quick, low cost change using known technology, can demonstrate that the benefits of a reduction program can greatly outweigh the costs and can lead to management support for a formal, comprehensive program.

1.3 What Facilities are Subject to the Law? (Toxics Law, Sections 2301, Definitions, and 2304-A, Regulated Community)

The three categories defined in the Toxics Law are: Toxic Use, Toxic Release, and Hazardous Waste. A facility may be in one, two, or all three categories, or it may not be in any of them, depending on the amount of toxics used or toxics released, or the amount of hazardous waste shipped. If a facility meets the criteria for one or more of the following categories, it is subject to the requirements of the Toxics Law.

- **Hazardous Waste Generation:** a facility that ships 2,640 lbs. or more of hazardous waste in a calendar year.

- **Toxic Use:** a facility uses enough extremely hazardous chemicals that it is required to report under the Federal Superfund Amendments and Reauthorization Act (SARA) of 1986 Title III, Section 312, for Extremely Hazardous Substances (EHS). A copy of the EHS list can be found at the following site: http://www.epa.gov/ceppo/pubs/title3.pdf

- **Toxic Release:** a facility releases enough toxic chemicals that it is required to report under SARA, Title III, Section 313, for Toxic Release Inventory (TRI) chemicals. In order to be subject to reporting requirements of Section 313, a facility must:

  - Have 10 or more full time employees;
  - Fall in Standard Industrial Classification (SIC) Codes 20-39 (manufacturers); as well as the following seven industry sectors that will report to TRI for the first time in July 1999:

    - Metal mining (SIC code 10, except for SIC codes 1011,1081, and 1094).
    - Coal mining (SIC code 12, except for 1241 and extraction activities).
    - Electrical utilities that combust coal and/or oil (SIC codes 4911, 4931, and 4939).
    - Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste treatment and disposal facilities (SIC code 4953).
    - Chemicals and allied products wholesale distributors (SIC code 5169).
    - Petroleum bulk plants and terminals (SIC code 5171).
    - Solvent recovery services (SIC code 7389).

- "Manufacture, process or otherwise use" a toxic chemical in excess of the established threshold quantities. In general, threshold quantities for toxic chemicals "manufactured or processed" are 25,000 pounds/year. Threshold quantities for toxic chemicals "otherwise used" are 10,000 pounds/year. However, some of the thresholds have been lowered on certain chemicals, including persistent bioacummulative toxins (PBTs) such as Mercury, which was lowered to 10 pounds. Further guidance on reporting requirements under Section 313, and a copy of the chemical list can be accessed electronically at http://www.epa.gov/tri/ or by calling the EPA EPCRA hotline at 1-800-424-9346.

1.4 What Facilities are specifically exempt from the Law? (Toxics Law, Section 2304-A).

The following are exempt from the planning, reporting and fee requirements of the Toxics Law:

A. Drinking water supply treatment facilities;

B. Municipal wastewater treatment facilities;

C. Wholesale distributors of chemicals;

D. Hazardous substance transporters;

E. Retail and wholesale distribution facilities of motor fuel, aviation fuel, heating oil or other refined petroleum products;

F. Agricultural activities;

G. Commercial hazardous waste treatment or storage facilities;

H. For purposes of the planning, reporting and fee requirements relating to hazardous waste generation only, pilot plants or pilot production units;

I. Hazardous waste transporters;

J. Hazardous waste generated as a result of remedial or corrective actions or facility closures required by law or undertaken to protect employee health and safety, public health and safety or the environment;

K. Households;

L. Zinc emissions from tire burning;

M. Sulfuric acid emissions from burning fuel that is approved by the Department, and

N. Lamps, mercury-containing thermostats, polychlorinated biphenyl ballast (PCB) and batteries defined as universal waste in 40 Code of Federal regulations, Section 273.2.

Please note that chemical or waste specific exemptions issued to facilities under the provisions of the "original TUR Law" are no longer valid, since the "amended Toxics Law" eliminated mandatory reduction goals. Chemicals or wastes that received facility specific exemptions under the "original TUR Law" should be reported on the biennial progress reports as detailed in Chapter 4.

1.5 Important Compliance Dates and Actions

The Toxics Law consists of three primary requirements for facilities, described as follows:

- Develop and maintain a Pollution Prevention (P2) plan, including facility specific reduction goals;
- Report reduction goals and progress towards meeting those goals to the Toxics Program in biennial reports;
- Pay annual fees to the Toxics Program, based on the amount of toxics used, toxics released, and/or hazardous waste generated.

These requirements and where you can find further guidance in both the Toxics Law and this guidebook are summarized in the table below.

Date	**Action**	**Section Law**	**Chapter Guidebook**
7/1/1999 and biennially thereafter	Notify and involve employees in Pollution Prevention (P2) plan development or update.	Sections 2305.4 & 2306	Chapter 2
1/1/2000	Develop P2 plans, including facility specific reduction goals, and update every 2 years.	Section 2305	Chapter 2
1/1/2000 and biennially thereafter	Develop and implement reduction goals.	Section 2305	Chapter 3
7/1/2000 and biennial thereafter	Submit biennial progress reports to the Toxics Program by July 1st of every even numbered year. Provide a copy of report to municipal officers in the town where the facility is located.	Section 2305-A & 2306	Chapter 4
10/1/2002 and annually thereafter	Submit annual fees to the Toxics Program.	Section 2311-A	Chapter 5
7/1/2000	Future Pollution Prevention Planning	Section 2305	Chapter 6

Chapter 2: Developing a Pollution Prevention (P2) Plan
(Toxics Law, Section 2305, Pollution Prevention Plans)

2.1 Overview of the Planning Process

The basis of the Toxics Law is that facilities are compelled to develop facility specific plans to reduce toxics and hazardous waste. Section 2305 of the Toxics Law requires that Pollution Prevention plans be updated every two years, and include the following components:

- A management reduction policy statement;
- A production unit analysis;
- Facility specific goals;
- Approval of the plan by a senior official, and
- Employee involvement, awareness and training.

Plans are to be developed and used by the facility. The plans remain on-site and are to be made available for inspection by the Department upon request.

Traditionally, planning involves a set of steps that include problem characterization, goal identification, option development, option analysis, and solution selection and implementation. The planning effort, while required by the Toxics Law, will be justified by the benefits achieved.

There are several characteristics of a successful planning process. They are:

- Planning is comprehensive. Good planning takes into consideration a broad range of problem characteristics, option ideas and available information. Planning is improved when built on a solid base of technical information and a thorough survey of the potential options.

- Planning is continual. The process is dynamic and includes facility wide representation and input.

- Planning is repetitive. Planning is repeated annually or biannually at a minimal level. It is a learning and building process based on the facility's reduction goals. Follow-up, evaluation, up dating and adjustment are all part the planning process.

- Planning is implementation driven. Planning should be in line with the facilities toxic reduction goals. Planning must include the facility's employees, management and technical staff that will carry out the recommendations of the plan. An effective plan should be technically and economically feasible. The reasoning of the Pollution Prevention plan should be parallel to the facility's goals. The steps or actions in planning are:

Planning Phases	**Action**
Organization	Obtain management commitment
	Recruit employee involvement
	Develop facility wide employee awareness and training
	Develop a policy statement
	Organize a planning team
Assessment Phase	Gather facility and process data
	Review and develop data
	Inspect the site
	Target chemicals/waste or processes
Analysis Phase	Identify and screen options
	Conduct a technical evaluation
	Conduct an economic evaluation
	Select options for implementation
	Establish reduction goals
	Obtain internal approval by senior management
Implementation	Implement pollution prevention and reduction options
	Track reductions and evaluate progress towards meeting facility goals

2.2 Management Policy (Toxics Law, Section 2305.1)

A successful Pollution Prevention plan has several key ingredients. First and foremost, it requires top management commitment. It should become an integral part of a company's corporate policy, product development, operational procedures and employee training. Without such a commitment by a company to seriously examine, and where appropriate, modify its product or operations, full benefits of a reduction plan cannot be realized.

Developing A Policy Statement

A policy statement should convey the goals of a reduction program to employees throughout the entire facility. The policy should be visibly posted throughout the facility. Employees should be formally involved in the creation of the policy to ensure an effective adoption of the policy.

A formal policy statement, while varying in detail, should answer the following questions:

- Why the facility is establishing a reduction program?
- What will be done to implement the program?
- Who will be responsible for the reduction program within the facility?

Policy Statement Example. "XYZ Company" is committed to excellence and leadership in protecting the environment and improving the workplace. In keeping with this policy, our objective is to reduce use, emissions and waste, and to minimize adverse impacts on the air, water and land. By successfully implementing source reduction, we can achieve cost savings, increase operational efficiencies, improve the quality of our products and services, maintain a safe and healthy workplace for our employees, and improve the environment. "XYZ Company's" environmental guidelines include the following:

- Environmental protection is everyone's responsibility. It is valued and displays commitment to "XYZ Company".

- We will commit to including toxic use reduction and energy conservation in the design of all new products and services.

- Reducing the use of toxics and the generation of hazardous wastes at the source is a prime consideration in research, process design, and plant operations. "XYZ Company" is committed to identifying and implementing reduction opportunities through encouraging and involving all employees.

- Technologies and methods, which substitute non-hazardous materials and utilize other source reduction approaches will be given top priority in addressing all environmental issues.

- "XYZ Company" seeks to demonstrate its responsible corporate citizenship by adhering to all environmental regulations. We promote cooperation and coordination between industry, government, and the public, toward the shared goal of preventing pollution at its source.

The manner in which the written policy is first presented to employees is an indication of overall company commitment. Posting the policy at workstations reinforces the policy message. A special meeting called to review the reduction program and solicit employee ideas, creates a powerful pollution prevention message.

2.3 Production Unit Analysis (Toxics Law, Section 2305.2)

This is the heart of the Pollution Prevention plan and the majority of this guide is dedicated to this topic. The work described in this section is best performed by the facility team (described in Section 3.4), as required by the Toxics Law, Section 2306.

2.3.A Identification, Characterization, and Accounting of Toxics and Hazardous Waste (Toxics Law, Section 2305.2.A)

Gathering and Organizing Facility Information
Targeting Chemicals and Processes for Detailed Analysis
Ranking Waste Streams
Creating a Process Flow Diagram
Understanding Unit Processes
Identifying a Facility's Product(s)
Grouping Products
Defining A Production Unit
Choosing a Unit of Product
Basic Materials Accounting
A Facility Walkthrough

Gathering and Organizing Facility Information

To begin, the planning team should prepare an overview of those chemicals and waste streams at the facility which come under the scope of the Toxics Law. These are:

- SARA, Title III, Section 312, Extremely Hazardous Substances (EHS)
- SARA, Title III, Section 313, Toxic Release Inventory (TRI) chemicals
- RCRA and state-listed Hazardous Wastes (Refer to State of Maine Hazardous Waste Rules 06-096 CMR Chapter 850), or use this link:

http://www.state.me.us/sos/cec/rcn/apa/06/chaps06.htm

The simplest way to establish a list, is to gather the facility's regulatory reports:

- State of Maine Chemical Inventory Reporting Form, used to report to the Maine Emergency Management Agency (MEMA);
- Form R for SARA, Title III, Section 313, used to report to the federal EPA; and
- Manifests and/or annual hazardous waste reports, used to report to the Maine DEP.

These reports will identify those chemicals or waste streams a facility is required to plan for. The team may also want to identify other chemicals and wastes at the facility that are not subject to the Toxics Law. For further information on identifying sources of production waste and process information, refer to Table 1.

Table 1 Sources of Facility's Background Production, Waste and Process Information.

Facility background information:	**Where to find information:**
Raw Materials Use	Purchasing and inventory records MSDS's Vendor information Production logs Packaging material discarded Shipping and receiving logs Annual report
Waste Generated	Waste manifests TRI data Sewer records (POTW's) Permits/applications Flow diagrams Annual report Rejected product Environmental reporting Waste collection and storage Production logs Environmental violations Laboratory analyses Obsolete and expired stock Spill and leak reports
Production Mechanisms	Operations manuals (SOP's) Vendor information Control diagrams Quality control guidebook Production logs Flow diagrams Product specifications
Process Interrelationships	Product-to-raw material data Flow diagrams Quality control data Production logs Product specifications Facility layout Economic Information Cost accounting reports Operating costs for waste handling and disposal Pollution control costs Costs for products, utilities, raw materials, and labor

(Ohio, 1999)

Targeting Chemicals and Processes for Detailed Analysis

Once the team has assembled the chemical or waste list, it can begin to focus on particular processes or products where the substance is used or the waste stream is generated. The goal is to answer the following questions for each chemical or waste stream:

1. What process(es) or operation(s) is it used in or does it come from?
2. How much is used/released/generated as waste each year?
3. Where do releases to the environment occur?
4. What are the annual costs to purchase, store, handle, treat and dispose of the substance?
5. What are current and future compliance and insurance costs?
6. Which regulation(s) is it subject to?
7. What are the environmental, health and safety characteristics of the chemical or waste? For example, do employees need special training or safety gear? Are there public health concerns?

To best answer these questions the team will need to collect more information than just the regulatory records previously mentioned. Table 2 suggests some sources of the information that the team might use.

Table 2 Sources of Process and Chemical Data

Source Type	Location of Sources
Environmental Records	SARA, Title III, Section 313, Form R or Form A Maine Chemical Inventory Report Form RCRA Waste Manifests Annual Hazardous Waste Reports Water, Air and Waste Permits or Licenses Waste Wastewater and Air Emissions Analyses or Monitoring Data Previous Environmental Assessment Reports
Process Schematics	Facility Blueprint Process Flow Diagrams or other Process Descriptions Piping Diagrams
Technical Data on Substances and Processes	Materials Safety Data Sheets (MSDS) Maintenance Procedures and Records Production Line Scheduling Records Production Line Job Sheets, Batch Make-up Records and Mix Tickets Equipment Operating Manuals Material Balances for Production and Pollution Control Processes
Technical Data on Products	Customer Specifications Quality Control Records Product Data Sheets
Other Business Records	Chemical Delivery Records Chemical Purchasing Data Product Sales Records Waste Transporter Invoices Scrap, Sales and Recycling Records
Financial Records	Departmental Cost Accounting Reports Handling, Treatment and Disposal Cost Records Chemical Purchasing Cost Records Water and Sewer Costs Including Surcharges Regulatory Compliance Costs Operating and Maintenance Costs

(Massachusetts, 1992).

Ranking Waste Streams

When establishing priorities for pollution prevention, all of the input and output streams should be ranked - beginning with those which require immediate attention, followed by those which are less urgent. Each company will have their own procedures for establishing priorities.

Companies should estimate the risks posed by each stream and consider the risks in the ranking process. These factors should be considered when ranking the streams:

- U.S. EPA's 17 target chemicals from the 33/50 program
- Toxic Release Inventory (TRI) chemicals
- High purchase, disposal and other costs
- High potential cost savings
- Highly toxic
- Hazardous waste
- Particular regulatory concerns
- High use and/or release rate
- Potential for removing bottlenecks in production or waste treatment
- Potential liability due to endangerment of employees, environment or the public
- Potential for successful implementation
- High volume waste (may include tonnage)
- Carcinogens
- Hazardous Air Pollutants (HAP's)
- Volatile Organic Compounds (VOC's)
- Persistent Bioaccumulative Toxins (PBT's)
- Chlorofluorocarbons (CFC's) and other ozone-depleting or future banned materials
- Local citizens' concerns

Once the streams are ranked, candidate input and output streams (especially wastes) can be identified for the initial pollution prevention assessment. As the assessment proceeds, these priorities may change. (Ohio, 1999).

Next, the team should organize all the data into a usable form. The goal is to identify toxic use activities, pinpoint sources of use, release and waste, and quantify their amounts. This can be done in four steps:

A. Creation of a process flow diagram;
B. Creation of a chemical pathway analysis;
C. Designation of production units; and
D. Development of a basic materials accounting system.

Creating a Process Flow Diagram

A process flow diagram depicts the steps through which raw materials pass as they are transformed into products. This diagram provides a clear picture of all stages of the production process, including the associated raw materials and the waste streams generated.

Process flow diagrams have historically been used to characterize industrial processes. For reduction planning, the process flow diagrams will differ from more familiar diagrams in that they are both broader and more detailed. For instance, traditional diagrams often fail to represent fugitive emissions or storage and handling areas before and after the process; a reduction process

flow diagram should incorporate these steps. Existing process flow diagrams, if your facility has them, are good foundations for your reduction initiative.

The diagram should identify points at which raw materials enter the process ("input points") as well as points at which all products, emissions and/or wastes leave the process ("output points"). Output points are not always obvious since wastes and emissions can take a number of forms, including spills, evaporated liquids, spent chemicals, unusable raw materials, and substandard or unusable products. A thorough exploration of all potential output points is necessary to find all possible wastes and emissions.

A typical process has raw material inputs, product outputs, and waste generation. It can be represented by a general process flow diagram. This diagram may not physically resemble the process, but will show the movement of raw material through the process, as well as the generation of the final product and waste. A simple diagram (Figure 3) of a metal parts fabrication facility illustrates this.

Figure 3: A Simple flow Diagram

In addition to the raw material, final product, and waste flows, other inputs can be represented on the general flow diagram, such as lubrication fluids, cleaning agents, cooling water, etc. This will provide an understanding of the overall process and the associated wastes. The general process can then be separated into individual or unit processes, as shown in Figure 4.

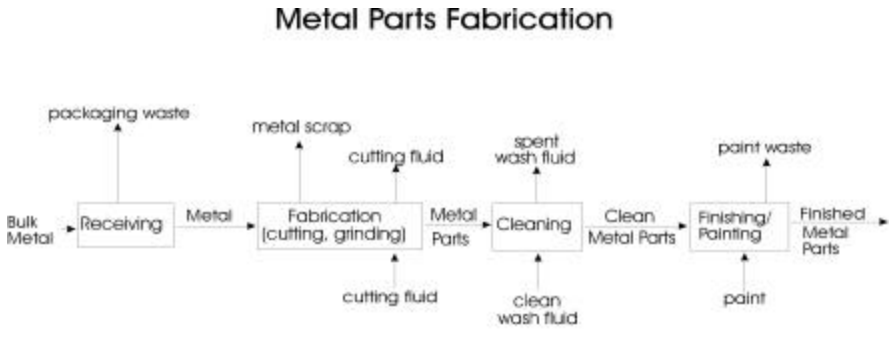

Figure 4: Simplified general process flow design

Understanding Unit Processes

Most production operations can be subdivided into a series of unit processes. For example, the general process of metal parts fabrication can be represented by at least seven individual processes as follows:

1. Receiving and storing bulk metal
2. Cutting, bending or shaping metal
3. Cleaning metal
4. Painting or coating metal
5. Assembling parts
6. Packaging
7. Shipping of assembled parts

Each unit process has its own inputs and outputs. The product from one step becomes the input material for the following step. The raw materials, products, and wastes for each unit process can be shown on a more detailed flow diagram. This diagram should contain the type/composition and quantity of raw materials, products, and wastes to all media. The diagram should also include other inputs including lubrication fluids, tooling water, cleaning agents, etc. Quantities used should be noted in a corresponding notation or table. The background information obtained previously will be helpful to determine the types/compositions and quantities of these streams.

The flow diagrams for the unit processes (and in some cases the general process) can be completed using either of two approaches: 1) start with the wastes and products generated and then determine the sources of the waste by going backwards through each of the unit processes, or 2) start with the raw materials and track them through each of the unit processes until products and wastes are generated as shown in Figure 2. For cases where waste streams are not separated but rather are combined prior to handling, the second method may be the preferred initial approach. The two methods may also be combined to complete the unit process flow diagrams, and thus a detailed overall process diagram.

Outputs

It is critical to determine the types/compositions and quantities of raw materials consumed, product yield, and wastes generated as accurately as possible for each unit process. All wastes released to the environment (gas, liquid, and solid) should be characterized. These wastes can include: emissions from stacks; vent emissions from process areas; fugitive emissions from pipes, tanks, or vessels and leaking equipment; spent wash waters/cleaning solvents; cooling water; over spray from painting operations; cleaning rags; material scrap (e.g., metal, packaging, etc.); and other wastes. By subdividing the process into individual components, these types of wastes become more evident. With this information, a materials balance can be performed for the unit processes and then for the overall facility. (Ohio, 1999).

It is also important to diagram periodic operations such as equipment cleaning, spills, maintenance and repair, which might use or produce toxic substances. It may be necessary to create separate process flow diagrams to characterize these operations.

Whatever the type of process, the final diagram should look roughly like a blueprint of a traditional linear assembly process, (i.e., a line of boxes), each labeled to indicate the production step it represents, and each connected to other boxes in a sequence which parallels the production sequence.

Identifying A Facility's Products

Within the Toxics Law, a product is defined as an output of a production process or quantifiable service by a facility. The definition of product is broader than the common understanding of the term. Intermediate products are considered products under the Toxics Law, as are certain service activities. Intermediate products may be outputs other than those considered as such by an industry. Designation as a product is for the purpose of establishing a measurement tool under the Toxics Law only. Products and intermediate products can usually be identified from existing information sources, such as accounting, inventory or manufacturing records, as the following example illustrates:

An electronic component manufacturer produces de-ionized water that is used for cleaning in the production of printed circuit boards. Under the product definition, the manufacturer could call de-ionized water "product," although they normally consider it an intermediate product because it is used for cleaning and is not sold.

Identification of the facilities products will help the planning team to focus on the processes of concern and to measure reduction progress in the future.

Products and intermediate products can usually be identified from existing information sources such as accounting, inventory or manufacturing records. The team should also consider whether any other items or intermediate products might meet the broad definition of product. Finally, the team should ask if the products should be treated as separate products or grouped together.

Grouping Products

Products can be grouped together if there are no significant differences in:

- The technologies used to produce them
- The usage of chemicals, or
- The creation of waste/emissions

Often, judgment is called for in deciding whether to group products or treat them separately. Some simple principles that might be useful are illustrated in the following examples:

A battery maker produces lead acid batteries of the same size and shape, using the same production processes and involving the usage of the same amounts of lead compounds, a regulated chemical. The various batteries have certain internal elements made of differing materials, such as silicon, clay or paper, none of which are listed chemicals.
Although sales records list and price the batteries as different "products", the manufacturer could group them for planning and reporting purposes.

Products are considered as discrete if significant differences exist, as the following example illustrates:

A firm produces two types of microfilm on one process line. The steps in the process are the same for each type of microfilm, except that in one of the process steps, a regulated chemical is used to produce one and not the other. The two types of microfilm should therefore be treated as separate products and not grouped into families.

While these three examples may not cover every situation, they can be used to guide the thinking of how "products" should be treated. Once the products have been identified, they can be linked to the processes identified earlier, to make a final determination on the facility's Production Units.

Defining a Production Unit

Under the Toxics Law, a Production Unit is defined as a process, line, method, activity, or technique, or a combination or series thereof, used to make a product. To determine a facility's production unit(s), the team should have developed the process flow diagrams and chemical pathway analysis described above, and determined the products of those processes. Through these exercises, discrete processes, (sometimes referred to as "unit operations" or "unit processes"), involving a regulated chemical or waste, can be identified.

Generally, similar process lines or unit operations may be grouped together into a production unit unless they involve different technologies, chemical usage, or produce different products. If significant differences exist, they should be treated separately.

It should be kept in mind however, that each unit operation involving a regulated chemical or waste must be accounted for in at least one production unit.

Many times, decisions on grouping unit operations may not be made until the facility team designates product/process combinations. Initially, the team may group similar unit operations, but then find that a given operation should be treated separately as the following example illustrates:

A manufacturer makes and sells painted and unpainted appliances. One regulated chemical is used in various cleaning steps for both types of appliances but the painted ones undergo an additional cleaning step involving a second regulated chemical.

The manufacturer could group the steps common to all appliances into one production unit and the cleaning step for painted appliances might be treated as a separate production unit. This approach depicts the product mix and the use of chemicals at the facility more accurately than grouping all the steps for all the appliances together.

A production unit will be assigned to each product and process steps that are treated separately. It is imperative to designate production units that accurately reflect the activities, products and chemical usage or waste production of the facility. Pollution prevention changes should be made, which will be both cost effective and achieve the targeted reduction goals. The team might want to put a product line, expected to change in the future, into a separate production unit.

Choosing a Unit of Product (Toxics Law, Section 2303.4 and 2309.5.A.)

A unit of product is a measure that reflects the level of production or activity associated with the use or release of a toxic chemical, or the generation of a hazardous waste. Determining a unit of product for each production unit is critical to tracking a facility's reduction progress. For some facilities this will be as easy as keeping track of the number of products produced annually (e.g., a chair manufacturer could use the number of chairs). For other facilities, however, this might not be a simple issue and other measures of production levels should be used such as pounds, square yards or gallons.

In choosing a unit of product, it is important to pick a measure of the facility's productivity that most closely reflects all activities involving the listed chemical. Those companies that report for toxic releases under SARA, Title III, Section 313, Form R, may already have selected a unit of product in order to determine their production or activity ratio. In addition, the unit of product should be one that is as free from non-production influences as possible. Sales, for example, are affected by a variety of factors such as: market share, pricing decision, inflation, etc., which are unrelated to production levels or chemical usage. Another example would be direct labor hours.

The unit of product is used to calculate your Activity Production Index (API), which will be submitted to the Toxics Program in your biennial reports. The API indicates whether your production has increased or decreased in relation to your base year, and is used to adjust your toxics use, toxics release or hazardous waste numbers up or down, in relation to your production. If your production has increased from your last reporting period, your API number should be higher. The unit of product selected by a facility will be reviewed by the Department, and may be rejected if it is determined to be inappropriate for the facility.

The following example illustrates some of the considerations involved in picking a unit of product.

A copper forming facility produces extruded copper products. Some of the choices for the unit of product include:

- Number of finished products manufactured
- Surface area of copper processed
- Mass of copper produced

The facility rejected the first two measures for the following reasons:

- Number of products produced fails to account for the wide range of sizes and shapes of the extruded products, which affect the amount of chemicals used. Information on the surface area of copper processed was not available and would be very difficult to collect.
- Mass of copper produced was chosen as the unit of product because the facility's production records are expressed in those terms and the mass of copper processed is directly related to the amount of waste/emissions generated.

Basic Materials Accounting

At this point the team has created a process flow diagram for each production unit of concern. They have identified the product(s) and established units of production. Now it is time to do some basic materials accounting to quantify chemical losses. The basis for materials accounting is the mass balance, also known as the materials balance. A mass balance works on the principle that all of a substance you put into a production unit can be accounted for. The substance must appear in the product, in processing wastes, must accumulate within the production unit, or must be used up in chemical reaction.

A materials balance accounts for all inputs and outputs into a process; in other words, what goes in must come out. A materials balance should be performed for each production unit. Although this typically is a very involved procedure, and while it is usually possible to identify sources of waste without having completed a materials balance, there are long term benefits to having done a materials balance. However, because a materials balance can be very involved, your facility may want to consider this an optional step, especially if you operate a small business. You may want to concentrate on developing process flow charts. Companies may also prefer to develop process flow charts in the preliminary assessment, and complete a materials balance later in the pollution prevention program.

A materials balance can help determine if fugitive losses are occurring in the process (e.g., fugitive loss from a solvent tank equals the difference between solvent in and solvent out). In a physical process, one in which there is no chemical change of materials, the raw materials that are not converted to product generally end up as waste. For example, a materials balance can be performed on the metal parts fabrication process as shown in Figure 4. For a chemical process, the materials balance becomes more complicated as raw material inputs are converted to products through one or more chemical reactions. Some unreacted raw materials may also end up as waste along with reaction by-products.

For these processes, a standard materials balance may already be available as part of the daily production log or cycle. Where possible, however, actual measurements of the amounts of materials used and generated should be used to produce the materials balance. The reason for this is that manufacturing processes can change over a period of time to a point where the actual materials balance would differ from that derived from the standard operating procedures.

Once the materials balance has been performed, the actual amount of each waste generated by a process becomes apparent, if not already known. These numbers are the baseline amounts of total waste generated at the start of the pollution prevention assessment and can be used for comparison throughout the implementation of the program.

Table 3 Materials Balance

Key Elements of a Materials Balance
Quantity of raw material brought on-site
Quantity produced on-site, including amounts produced as production by-product
Quantity consumed on-site
Quantity shipped off-site as, or in, product
Total waste generation (before recycling and treatment) and waste characteristics
Amount of raw material in beginning and ending inventory
An indicator of production levels involving the chemical
Release and transfer rate

(Ohio, 1999)

Facility Walkthrough

A site walkthrough of the facility to review production units is an important final step in the data collection phase. It provides an opportunity to answer any data questions, resolve data conflicts, and verify earlier assumptions. In conducting a walkthrough, the team should follow the process from the point where raw materials enter, to where products and wastes leave the facility. It is advisable to prepare an agenda, in advance, that covers all points that require clarification, including time to interview the operators in the assessed area. The employees who are familiar with a facility's operations are often the best source of suggestions for potential reduction options. Also advisable is to schedule the walkthrough to coincide with the timing of the particular operation that is of interest (e.g., bath sampling, bath dumping, start-up, etc.). Be sure to monitor the operation at different times during the shift, and if needed, during all shifts, especially when chemical release is highly dependent on human involvement. The following items should be checked during the walkthrough:

- Signs of poor housekeeping (i.e., clutter, unswept floors, uncovered or leaking drums)
- Open containers, stacked drums or areas too small to contain materials, indicating poor storage procedures.
- Waste generated from the processes (dripping water, steam, leaks, spills, and evaporation)
- Discoloration or evidence of corrosion or rust on walls, work surfaces, floors, ceiling or pipes, indicating system leaks or poorly maintained equipment.
- Evidence of smoke, dirt or fumes, indicating material losses
- Evidence of strange odors or irritants to the upper respiratory system, indicating potential system leak.
- Insufficient labeling of containers, and signs to indicate chemical storage areas, including MSDS, indicating lack of employee health and safety training.
- Low/or no visibility of emergency equipment, indicating a lack of ability to respond to medical and environmental emergencies.
- Scrap or off-spec parts lying around, indicating waste or poor inventory control
- Outdated inventory stock or materials no longer in use, indicating areas of less control of production accounting.

Once the walkthrough is completed, the data-gathering phase is complete. The team should now be ready to begin the analysis phase of the planning effort.

2.3.B Identification, Analysis and Evaluating of Reduction Options (Toxics Law, Section 2305.2.B)

Identifying Options
Initial Screening of Options
In-depth Option Analysis
Direct Cost and Savings
Indirect Cost and Savings
Intangible Benefits
Conducting an Economic Feasibility Analysis

Identifying Options

During this step of the planning process, the objective is to generate a comprehensive list of reduction options that may be utilized to meet the facility's goals. The team may have identified some potential reduction opportunities while collecting the data or performing the facility walkthrough. Through group creative thinking, such as brainstorming or root cause analysis, other ideas may surface. Structuring the identification of options according to the environmental management hierarchy found in Section 2302 of the Toxics Law, will encourage the team to look at toxic use reduction options first, and is required by Section 2305.2 of the Toxics Law.

There are several tools available to companies in getting started in the identification of options process. The Web has many sources on pollution prevention, including some of the following web sites:

http://www.iwrc.org/
http://www.p2rx.org/
http://www.p2.org/inforesources/SearchP2Gems.cfm
http://www.globalff.org/ (source and cost reduction)
http://www.wmrc.uiuc.edu/ (pollution prevention w/emphasis on HW and clean manufacturing)

Please refer to the Department's Pollution Prevention (P2) web site for continual updates of resource listings at http://www.state.me.us/dep/oia/p2home.htm Also on the P2 web site you can find case studies, with detailed discussions on how certain industry's pollution prevention methods were developed. Further methods of identifying reduction options could involve talking to other companies, reviewing the Best of Class data base, which is being compiled by the Toxics and Hazardous Waste Reduction Program (THWRP) staff, contacting trade associations, retaining a pollution prevention consultant, and requesting technical assistance, including an on site visit, by the THWRP staff.

Initial Screening of Reduction Options

Screening is a "rough cut" judgment of the reduction options identified in the previous steps. Some options may involve negligible capital costs and can be implemented quickly with no further evaluation.

The screening procedure may be informal or very structured, depending on the number and complexity of the proposed options. A sample option screening worksheet is offered in Table 4, which outlines some of the criteria the team might consider. Evaluating the criteria and ranking the options, which have several beneficial effects, could then be more thoroughly evaluated.

Table 4. Sample Options Screening Worksheet

Production Unit ID Number _____

Production Unit Description _____
_____

Chemical or Waste Stream of Concern_____
_____

Options Identified (Rate each criteria: High, Medium or Low):

1.

2.

3.

4.

5.

	Reduction Option ID #				
Option Screening Criteria	1	2	3	4	5
Reduction of Waste Management Costs					
Reduction of Input Materials Costs					
Insurance & Liability Savings					
Reduction of Toxicity of Waste					
Reduction of Health & Safety Hazards					
Ease of Implementation					
Low Capital Cost					
Low Operation & Maintenance Cost					
No Effect on Product Quality					
No Effect on Productivity					

In-depth Option Analysis

The options that were selected for further evaluation should now be examined in greater depth for their technical and economic feasibility.

A. Technical Feasibility

The technical evaluation asks questions similar to those asked during the initial screening. However, the effort goes into greater detail to identify the workplace implications of a proposed option. If after the technical evaluation the option appears impractical or can be expected to lower product quality, it should be dropped from further consideration. Some examples of questions that should be considered in a technical evaluation are given below.

Figure 5. Typical Technical Evaluation Criteria

- Will it reduce the use or release of toxic chemicals, or the generation of waste?
- Is the system safe for workers?
- Will product quality be maintained or improved?
- Is there space available in the facility?
- Will the new equipment, materials, or procedures be compatible with production operating procedures, workflow, and production rates?
- Will it be necessary to hire additional labor to implement the option?
- Will it be necessary to train or hire personnel with special expertise to operate or maintain the new system?
- Does the facility have the utilities needed to run the equipment? Or, must new utilities be installed at increased capital cost?
- How long will production be stopped during system installation?
- Will the vendor provide acceptable service?
- Will the system create other environmental problems?
- Will any new permits or licenses be required?

Attempt to quantify the answers to the technical evaluation criteria. All groups in the facility that will be affected directly if the option is adopted should contribute to the technical evaluation. This might include people from production, maintenance, quality control, and purchasing. In some cases, customers may need to be consulted and their requirements verified.

For options that do not involve a significant capital expenditure, the team can implement a quicker approach such as procedural or housekeeping changes. More expensive equipment-related options or process changes are usually more involved, particularly if they may affect production rate or product quality, and will require a further detailed study. The planning team may inspect similar installations at other facilities, obtain information from vendors and industry contacts, or use rental test units for bench-scale or pilot-scale experiments to complete its assessment.

B. Economic Feasibility

The viability of many prevention investments rests on sound economic analyses. Facilities may not invest in a reduction project unless that project successfully competes with alternative investments.

The economic feasibility analysis examines and compares the costs and savings that will result from each reduction option. During an economic analysis, the planning team should consider direct costs, typically capital and operating expenses, indirect costs, and potential intangible benefits. An adequate cost accounting system and the process of developing a comprehensive assessment of investment options is explained further in the following sections.

Direct Costs and Savings

Cost elements need to be broken down into capital costs and operating costs to perform the economic evaluation of reduction options. A determination should be made of the capital costs associated with the implementation of the reduction option, as well as typical production unit operating costs both before and after the reduction project. A baseline of operating costs will assist the team in measuring future cost savings.

Capital costs include not only the fixed capital costs for designing, purchasing and installing equipment, but also one-time costs for working capital, permitting, training, start-up, and financing charges. Procedural or materials changes, can have minimal or no capital costs.

Operating costs typically include the costs of raw materials, maintenance, supplies, labor, utilities, waste transportation, disposal, storage, and handling, on-site pre-disposal treatment and other fees. Operating costs may be partially offset by revenues from increased production or from the sale or reuse of products. Cost savings are typically reflected in lower operating costs.

Table 5 provides a sample worksheet for tabulating capital and operating costs for a reduction project.

Table 5. Summary Worksheet for Capital and Operating Costs

Cost Item	**Cost**
Purchased Process Equipment	
Materials	
Utility Connections	
Additional Equipment	
Site Preparation	
Installation	
Engineering and Procurement	
Start-up Cost	
Training Costs	
Permitting Costs	
Initial Charge of Catalysts and Chemicals	
Fixed Capital Investment	
Working Capital	
Total Capital Investment	
Incremental Operating Costs/Revenue Item and Summary	**Cost per year**
Decrease (or increase) in Disposal Cost	
Decrease (or increase) in Raw Materials Cost	
Decrease (or increase) in Utilities Cost	
Decrease (or increase) in Catalysts and Chemicals	
Decrease (or increase) in O & M Labor Costs	
Decrease (or increase) in O & M Supplies Cost	
Decrease (or increase) in Insurance/Liabilities Costs	
Decrease (or increase) in Other Operating Costs	
Incremental Revenues from Increased (Decreased) Production	
Incremental Revenues from Marketable By-products	
Net Operating Cost Savings	

Indirect Costs and Savings

Areas where a facility typically incurs indirect costs are listed below in Figure 6. Traditionally, these regulatory and liability costs have been allocated to the facility overhead account. As with direct costs, it is important to segregate indirect costs from overhead in order to establish a baseline. Indirect cost savings includes reduced regulatory costs and avoided potential liability.

Figure 6	**Indirect Costs Associated with Regulatory Compliance**
Capital Costs	**Operations and Maintenance Costs**
Control Equipment	Notification
Monitoring Equipment	Laboratory Fees
Preparedness and	Planning/Studies/Modeling
Protective Equipment	Reporting
Waste Storage Space	Insurance
	Penalties/Fines
	Record Keeping, Manifesting & Labeling
	Training
	Inspections
	Permits
Indirect Cost Associated with Liability	
Soil and Waste Removal and Treatment	Ground Water Removal and Treatment
Surface Sealing	Personal Injury
Property Damages	Natural Resource Damage

Indirect costs can be extremely difficult to quantify. It is important that a facility attempts to determine and allocate indirect costs to the specific process line or product. The true costs of using a particular chemical can then be determined, and a meaningful cost/benefit analysis of potential reduction options can be conducted.

Intangible Benefits

Intangible benefits include factors such as: greater product acceptance by consumers, an improved corporate image, and improved public and employee relations. It may be difficult to quantify the degree to which these factors will result in increased company revenues. For example, if a company can use an innovative reduction program to distinguish itself from its competitors, it may receive favorable publicity or attention that can serve to further promote its products. At a minimum, intangible benefits should be reviewed with management after presenting the more easily quantifiable and allocable costs.

Conducting an Economic Feasibility Analysis

Proposed reduction projects compete with alternative investments a company might make. Pollution prevention investments have the potential for appearing less attractive than they should, because standard accounting systems usually do not track environmental (indirect) costs well. In recognition of this fact, a comprehensive financial analysis tool called Total Cost Assessment (TCA) has been developed. TCA differs from conventional project analysis methods in four key ways:

- The inventory of costs, savings, and revenues includes indirect, less tangible items, typically omitted from project financial analysis;
- Costs and savings are directly allocated to specific process and product lines instead of being lumped in overhead accounts;
- Time horizons for calculating the return on investment are extended to capture long term benefits; and
- Indicators of profitability capable of incorporating the time value of money and long term costs and savings are used.

When TCA is tailored to a company's needs, a clearer picture of profitable opportunities can be produced, which might otherwise be underestimated. At a minimum, the planning team should be able to estimate costs following completion of the Summary Worksheet for Capital and Operating Costs (Table 4). In addition, there are electronic finance packages available, such as; http://www.tellus.org/general/software.html http://www.epa.gov/oppt/acctg/ and EPA's web site, to name a few.

2.3 C Strategy and Schedule for Implementing Reduction Options (Toxics Law, Section 2305.2.C)

Implementation steps for reduction projects will differ from company to company and from project to project. The following should be addressed when considering reduction options:

1. The creation of the plan is only one step in the planning process. Follow-up, evaluation of implemented pollution prevention projects, updating and adjustment are all part of a reduction program. Annual program evaluation can be extremely useful.

2. Plans must contain a strategy and schedule for implementing selected options. The best strategy would be one that is all-inclusive, from presenting the project(s) for management approval, to training employees and developing evaluation concepts. The schedule may include important milestones.

3. It is important to coordinate with all personnel involved in a change and to make sure that training is provided if necessary.
4. A discussion of your progress in relation to your implementation schedule is required as part of your biennial progress report.

2.3.D Recycling Markets and Reuse Opportunities (Toxics Law, Section 2305.2.D)

Once a material has become a waste, a facility has a decision to make about how that waste will be managed. Reuse within the facility is the optimum option, followed by on-site recycling. If neither of these are viable options, the facility should then consider off-site reuse or off-site recycling.

It is important to know that Maine regulations (as of December 1992) require hazardous waste going for reuse must still be managed according to the Maine Hazardous Waste Rules. In addition, if the receiving facility is in Maine, it must have a license (by rule) to beneficially reuse the waste. If the waste is shipped out-of-state for reuse, the receiving facility must have any necessary permission from the state in which it is located. For more information on the rules concerning beneficial reuse, please contact the Department at:

Maine Department of Environmental Protection
Bureau of Hazardous Materials & Solid Waste Control
State House Station #17
Augusta, Maine 04333
(207) 287-2651

Chapter 3: Planning and Implementation of Reduction Goals (Toxics Law, Section 2305.2-A)

3.1 Overview of Planning Reduction Goals

The main tool to reach your reduction goal is the planning process. Careful planning can help a facility identify and evaluate potential changes in their products or processes that could result in the reduction or elimination of pollution.

The Toxics Law Section 2302, establishes an environmental management hierarchy to guide facilities in their reduction efforts. It is important to understand that the hierarchy is the same for all members of the regulated community, despite the category(ies) a particular facility may be in. For example, a facility that is only a hazardous waste generator under the Toxics Law should still consider the reduction methods listed under Toxic Use Reduction, before those listed under Hazardous Waste Reduction. The hierarchy is presented in descending order of preference.

1. Toxics Use Reduction: This involves reductions in the use of toxic substances through changes in the product or production process. These changes may be made through the application of any of the following techniques:

A. Input substitution, which refers to replacing a toxic substance or raw material used in a production or other process or operation, with a non-toxic or less toxic substance;

B. Product reformulation, so that the end product is non-toxic or less toxic upon use, release or disposal;

C. Production or other process or operation redesign or modification;

D. Production or other process or operation modernization, which refers to upgrading or replacing existing equipment and methods; and/or

E. Improved operation and maintenance controls of production or other process or operation equipment and methods including, but not limited to, improved housekeeping practices, system adjustments, product and process inspections, or production or other process or operation control equipment.

2. Toxics Release Reduction: Reduction in the release of toxic chemicals may be accomplished by the methods listed above, or by any change that reduces or avoids worker or environmental exposure.

3. Hazardous Waste Reduction: The reduction of hazardous waste(s) may be accomplished by the techniques given above, followed by, and in descending order of preference;

A. On-site Recovery- of toxics for reuse
B. On-site Recycling
C. Off-site Recycling
D. Off-site Treatment- to reduce volume, toxicity, or both.

Activities 3A and 3B may require an abbreviated license from the Department. Receiving facilities conducting any of the above activities should contact the Department regarding licensing requirements.

3.2 Setting Facility Specific Goals (Toxics Law, Section 2305.2-A)

As stated in the Toxics Law, the facility's 2-year numeric goals must be established for reducing the aggregate amount of Extremely Hazardous Substances (EHS) used, the aggregate amount of toxic chemicals released, and/or the aggregate amount of hazardous waste shipped by the facility, by 2002, 2004 and 2006. The goals must be established per unit of product to account for changes in the level of production activity from year to year.

These goals could include the Toxic Law's statewide reduction goals, or they may be more or less ambitious. Numerical goals for waste reduction may be established once the wastes are characterized. Goals should be established from existing baseline data and build upon reductions. For example, if you have already achieved a 30% reduction, your goals might be a 35% reduction by 2002, a 40% reduction by 2004 and a 45% reduction by 2006. A 100% reduction indicates complete elimination. Goals may be continually updated as they are achieved. This emphasizes the concept of continuous quality improvement, and is an important component of a pollution prevention program. Do not remain static. Build on the successes achieved. Goals the team selects need to have management endorsement and be understandable to all employees.

3.3 Internal Plan Approval (Toxics Law, Section 2305.3)

A senior management official, with management responsibility for the person or persons completing the plan, must sign the Pollution Prevention (P2) plan.

3.4 Employee Involvement, Awareness, and Training (Toxics Law, Section 2305.4 and 2306)

The Toxics Law requires each regulated facility to provide an employee awareness and training program, and to involve employees during both the planning process and plan implementation to

the maximum amount feasible. At a minimum, in accordance with Section 2306, each facility must:

- Notify all employees of the requirements for a Pollution Prevention (P2) plan;
- Identify the toxic substances, wastes, and production units for which plans must be developed;
- Involve employees in developing P2 plans and updates, including toxics and hazardous waste reduction options;
- Employees represented by labor organizations (if formed) and selected by the labor organization, must be involved in the development of the plan at the facility; and
- Employees not represented by a labor organization must be on the committees formed to develop the plan.

Each facility needs to develop an employee program to fit its particular needs. The following concepts should aid you in developing and implementing your employee-training program:

1. Change can be very uncomfortable, therefore it must be justified. Make sure employees know what the outcome of the changes will be, and why those outcomes are worth their efforts. Make the potential employee benefits clear, i.e., improved worker safety, increased environmental protection, etc.

2. Provide employees with some education in reduction concepts.

3. Allow employees a mechanism and time to become involved in the planning as well as the implementation phase of the toxic reduction program. Involvement will help them feel responsible for the reduction program and therefore improve cooperation and the likelihood of success.

3.5 Organizing a Planning Team

Developing a good Pollution Prevention plan requires a comprehensive understanding of how the facility operates. A larger facility may need a greater number of individuals to represent the facility in the planning process. All aspects of your operations, including employees from each major area of the facility, should be represented within your planning team. This provides insurance that the entire team will understand how each area of the facility operates and how that operation might be successfully changed.

Table 6 lists some possible team members and how each might contribute. A small facility might have a team of two to three people, because each has a broad range of responsibilities. The team(s) should be tailored to meet the facility's needs; i.e., a facility may have a single small team, multiple small teams, or one or more large teams.

After a team is selected, it is helpful to publicize its existence. This can be done when the management policy statement is presented. The notice can also state a mechanism for employees to make suggestions or comments on possible reduction options. Collecting ideas from employees in all areas of your business will help to identify all possible reduction options.

Table 6 The Planning Team

Member	Potential Responsibilities
1. Management	• Demonstrate corporate commitment • Set and enforce long-term goals • Have authority to implement changes
2. Engineering and Design	• Provide information on current processes • Contribute ideas for changing processes • Gauge the technical feasibility of proposals • Identify parameters for optimal functioning
3. Environmental Compliance	• Calculate treatment and disposal costs • Gauge environmental effects of proposals • Ensure compliance with regulations
4. Finance/Purchasing	• Calculate costs of current operations • Calculate costs and savings of proposals • Track costs and benefits of actual changes • Implement changes in inventory control • Development of screening process for new products
5. Sales & Marketing	• Provide insight into customer needs • Educate customers about reduction changes • Market products as environmentally responsible • Monitor customer reactions to product changes
6. Production and Maintenance Workers	• Provide accurate descriptions of production and maintenance practices • Suggest ideas on new approaches • Gauge compatibility of changes with work practices • Supply feedback on frontline effects of changes • Increase worker support for production line and maintenance changes
7. Quality Control	• Gauge compatibility of changes with quality specifications
8. Legal	• Gauge effects of reductions on regulatory requirements • Gauge effects of reductions on corporate liability
9. Health & Safety	• Provide data on health and safety effects of toxics • Evaluate effects of reductions on worker health and safety
10. Material Control & Inventory	• Provide data on health and safety effects of toxics • Suggest methods for improving storage and handling
11. Research & Development	• Consider modifications to product design • Consider reduction goals during new product development
12. Customer	• Provide insight on customer needs

Chapter 4: Documenting Pollution Prevention Progress

4.1 Measuring Progress (Toxics Law, Section 2305.2.E)

The collected data should accomplish two distinct goals; 1) it should show where inefficiencies occur in the production units under study, and 2) it should enable the facility to track its reduction progress. Owners or operators of facilities shall keep a complete copy of the P2 plan and any backup data on the premises of that facility for at least 5 years, and make the copy and data available to the Commissioner or the Commissioner's designee upon request, as stated in Section 2305 of the Toxics Law.

With comprehensive data of the facility, the team should be able to complete the biennial progress report spreadsheet. This spreadsheet will be mailed to facilities during the report year, and is also available via e-mail, and also on the THWRP Web page: www.state.me.us/dep/oia.htm. The spreadsheet is designed to give the team a comprehensive understanding of each production unit. Taking data from the process flow diagram, chemical pathway analysis, and basic material accounting results, the team can use the spreadsheet to account for the presence of a hazardous waste stream, a chemical's use, or release, for each production unit. This can help in documenting a production unit's baseline and tracking that units reduction progress.

The Activity Production Index (API), is a ratio of the facility's current production to its base year production. The API is used in the calculation for reduction as a multiplier to normalize production and waste values. The API is tied to production, so if a facility produces different products, which involve different processes, more than one API should be derived to represent each production process, (also known as the Production Unit).

Toxic Use API = $\frac{\text{2003 Production or Activity}}{\text{(1990 Production or Activity)}}$

Toxic Release API = $\frac{\text{2003 Production or Activity}}{\text{½ (1990 + 1991 Production or Activity)}}$

Hazardous Waste Generated API = $\frac{\text{2003 Production or Activity}}{\text{½ (1987 + 1989 Production or Activity)}}$

Once the API has been determined, then the Adjusted Amount (AU) is calculated by:

Toxic Use

$$\text{Adjusted Amount (AU)} = \frac{\text{Pounds of toxics used in report year}}{\text{API of report year}}$$

Toxic Release

$$\text{Adjusted Amount (AU)} = \frac{\text{Pounds of toxics released in report year}}{\text{API of report year}}$$

Hazardous Waste Generated

$$\text{Adjusted Amount (AU)} = \frac{\text{Pounds of waste generated in report year}}{\text{API of report year}}$$

The total amounts of chemicals used, released and hazardous waste shipped may be summed and plugged into one of several formulas to determine reduction progress over time. The key to accurate measurement of reduction progress lies in the selection of appropriate production units, products and unit of products. The following equations are used to calculate reductions in each of the three Toxics reporting categories:

Toxic Use Reduction

$$\% = \frac{\text{AU - Pounds of toxics used in base year}}{\text{Pounds of toxics used in base year}} \times 100$$

Toxic Release Reduction

$$\% = \frac{\text{AU - Pounds of toxics released in base year}}{\text{Pounds of toxics released in base year}} \times 100$$

Hazardous Waste Generated Reduction

$$\% = \frac{\text{AU - Pounds of waste generated in base year}}{\text{Pounds of waste generated in base year}} \times 100$$

The reduction amount calculated must be reported as an *increase* if the amount is a *positive* number, and as a *decrease* if the amount is a *negative* number. Accurate measurement of reduction progress, as well as documentation of cost savings, will justify support for future pollution prevention projects.

4.2 The Biennial Progress Report (Toxics Law, Sections 2305-A and 2306)

Biennial progress reports must be submitted to the Toxics Program by July 1st, of even numbered years. Report forms are available from the Toxics Program in hard copy, via e-mail, or electronically from our web page at: http://www.state.me.us/dep/oia/turforms.htm Detailed instructions for completing the report form are included with the report. A separate report

must be submitted for each category a facility is subject to; (i.e., Toxic Use, Toxics Release, and/or Hazardous Waste).

In accordance with the Toxics Law, Section 2306, a copy of the biennial reports must also be provided to the municipal officers of the municipality in which the facility is located, also by the July 1st deadline, when the report is submitted to the DEP.

The reports must include the following information:

- Facility specific goals set by the facility;
- Progress achieved in meeting those goals;
- Methods used to achieve reductions;
- Explanation of facilities progress or lack of progress in meeting goals;
- A description of employee involvement;
- Future pollution prevention methods to be used in the coming 2 years;
- A written certification from a senior management official.

Chapter 5 Toxics Program Annual Fees (Toxics Law, Section 2311-A)

Fee invoices are mailed to the facilities subject to the Toxics Law approximately 45 days in advance of the fee due date. Fees in all 3 categories are due annually by October 1st. Facilities subject to the law are required to pay the following fees to the Toxics Program, based on the number of Extremely Hazardous Substances (EHS) used, and/or toxic chemicals released, and/or the amount of hazardous waste shipped. A facility cannot be assessed more than $1000.00 in Toxics Program fees per year.

Category	Due Date	Amount (paid in arrears)
Toxic Users	October 1st	• $100 per EHS chemical used, reported under SARA, Title III, Section 312, for the previous year.
Toxic Releasers	October 1st	• $100 per TRI chemical released, reported under SARA, Title III, Section 313, for the previous year.
Hazardous Waste	October 1st	• $1,000 for shipments of 5,000 pounds or more in the previous calendar year. • $500 for shipments of between 4,999 and 2,640 pounds, in the previous calendar year. • $100 for shipments of between 2,639 and 661 pounds in the previous calendar year. • No fee is required for shipments of less than 661 pounds in a calendar year.

CHAPTER 6 Planning Future Pollution Prevention

6.1 Revisit the Planning Process

Repeat the planning process. Plans must be updated biennially, by January 1st of every even numbered year, in accordance with the Toxics Law. New goals for the next two years must be established.

However, a facility's planning team should meet on a scheduled basis during the course of the year to ensure Pollution Prevention (P2) plans stay on schedule and new technologies can be discussed. It is recommended that process maps and lists of options be refreshed regularly. More accurate data on production use and waste generation may become available during this time.

6.2 Measure your Environmental Performance

If your facility has not developed an Environmental Management System (EMS), now may be the time, while you have a clear understanding of your pollution prevention options and goals.

An EMS is a more comprehensive review of a facility's environmental issues. The P2 plan could provide a firm platform for a company to evaluate their operations for better environmental performance and creating an EMS plan. An EMS can provide the tools for further integration of environmental and operation performance. For further information on EMS, visit the P2 page of our web site at: http://www.state.me.us/dep/oia/ems.htm

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Appendix A.

Chapter 26

TOXICS USE AND HAZARDOUS WASTE REDUCTION LAW

§2301. Definitions (new).

As used in this chapter, unless the context otherwise indicates, the following terms have the following meanings. [1989, c. 929, §7 (new).]

1. Commercial hazardous waste facility: "Commercial hazardous waste facility" has the same meaning as in section 1303-C, subsection 4. [1989, c. 929, §7 (new).]

2. Cross-media pollution: "Cross-media pollution" means pollution that has an impact on, or degrades more than one environmental resource. [1989, c. 929, §7 (new).]

3. Disposal: "Disposal" has the same meaning as in section 1303-C, subsection 12. [1989, c. 929, §7 (new).]

4. Extremely Hazardous Substance: (EHS) "Extremely hazardous substance" has the same meaning set forth in the SARA, Title III, Section 302, and listed in 40 Code of Federal Regulations, Part 355. [1989, c. 929, §7 (new).]

5. Facility: "Facility" means the place of business or site where toxics are used, toxics are released or hazardous waste is generated. [1989, c. 929, §7 (new).]

6. Generation: "Generation" has the same meaning as in section 1303-C, subsection 13. [1989, c. 929, §7 (new).]

7. Generator: "Generator" means the owner or operator of a facility that generates hazardous waste. [1991, c. 520, §6 (amd).]

8. Hazardous waste: "Hazardous waste" means those wastes determined by the Board of Environmental Protection to be hazardous pursuant to section 1319-O, subsection 1. [1989, c. 929, §7 (new).]

9. Manifest: "Manifest" has the same meaning as in section 1303-C, subsection 19. [1989, c. 929, §7 (new).]

10. Pilot plant or pilot production unit: "Pilot plant or pilot production unit," means a small-scale model or a temporary change in the production process undertaken to test or develop a new technology. [1989, c. 929, §7 (new).]

11. Practicable: "Practicable" means available and capable of accomplishment after taking into consideration the existing state of technology and economic feasibility for the facility involved. [1989, c. 929, §7 (new).]

11-A. Product: "Product" means an output of a production process or a quantifiable service by a facility. [1991, c. 520, §7 (new).]

12. Production unit: "Production unit" means a process, line, method, activity or technique, or a combination or series thereof, used to produce a product.

[1991, c. 520, §8 (rpr).]

13. **Recycle**: "Recycle" has the same meaning as in section 1303-C, subsection 21.

[1989, c. 929, §7 (new).]

14. SARA: "SARA" means the Superfund Amendments and Reauthorization Act of 1989, Public Law 99-499. 1989, c. 929, §7 (new).]

15. Storage: "Storage" has the same meaning as in section 1303-C, subsection 36.

[1989, c. 929, §7 (new).]

16. Toxic substance or toxics: "Toxic substance" or "toxics" means any substance in a gaseous, liquid or solid state listed pursuant to the SARA, Title III, Section 313, and listed in 40 Code of Federal Regulations, Part 372.65 and any extremely hazardous substance as listed in 40 Code of Federal Regulations, Part 355. [1991, c. 520, §9 (amd).]

17. Toxics releaser: "Toxics releaser" means an owner or operator of a facility that is required to report under the SARA, Title III, Section 313. [1989, c. 929, §7 (new).]

18. Toxics use reduction: "Toxics use reduction" means front-end substitution, product reformulation or in-plant changes in production processes or raw materials that reduce, avoid, or eliminate the use of toxics or the generation of toxic by-products per unit of product, to reduce risks to the health of workers, consumers, or the environment, without shifting risks among workers, consumers or parts of the environment. [1991, c. 520, §9 (amd).]

19. Toxics user: "Toxics user" means a person that is required to report the presence of extremely hazardous substances under the SARA, Title III, Section 312.

[1989, c. 929, §7 (new).]

20. Treatment: "Treatment" has the same meaning as in section 1303-C, subsection 39.

[1989, c. 929, §7 (new).]

21. Waste assessment: "Waste assessment" means a systematic, planned procedure, to identify ways to reduce or eliminate waste. [1991, c. 520, §9 (amd).]

§2302. Toxics use reduction and hazardous waste management policy

It is the policy of the State to reduce the amount of the toxic substances used in the State, to reduce worker and environmental exposure to the release of toxic substances, to reduce the hazardous waste generated within the State and to minimize the transfer of toxic pollutants from one environmental medium to another. The State encourages an integrated approach to toxics use reduction, toxics release reduction and hazardous waste reduction based on the hierarchies of

pollution prevention management strategies included in this section. It is further the policy of the State that the process of reducing the use and release of toxic substances and reducing the generation of hazardous waste through planning and analysis of manufacturing and commercial processes is ongoing and that the principles of continuous improvement in pollution prevention and open, public accountability must be applied to environmental quality management efforts in both public and private facilities. [1999, c. 348, §1 (amd).]

1. **Toxics use reduction.** The State encourages reducing the use of toxic substances through changes in production or other processes or operations, in products or in raw materials that reduce, avoid or eliminate the use or production of toxic substances without creating substantial new or increased risks to public health, safety and the environment. These changes may be made through the application of any of the following techniques:

   A. Input substitution, which refers to replacing a toxic substance or raw material used in a production or other process or operation with a nontoxic or less toxic substance; [1989, c. 929, §7 (new).]

   Product reformulation, which refers to substituting for an existing end product, an end product that is nontoxic or less toxic upon use, release or disposal; [1989, c. 929, §7 (new).]

   Production or other process or operation redesign or modification; [1989, c. 929, §7 (new).]

   Production or other process or operation modernization, which refers to upgrading or replacing existing equipment and methods; and [1989, c. 929, §7 (new).]

   B. Improved operation and maintenance controls of production or other process or operation equipment and methods including, but not limited to, improved housekeeping practices, system adjustments, product and process inspections, or production or other process or operation control equipment or methods.

   [1989, c. 929, §7 (new).]
   [1991, c. 520, §10 (amd.).]

2. **Toxics release reduction.** The State encourages reducing the release of toxics during manufacturing and other processes through, in addition to encouraging the toxics use reduction techniques specified in subsection 1, in-plant changes in production or other processes or operations that reduce or avoid exposure of workers and the environment to toxics.
   [1999, c. 348, §2 (amd).]
   [1991, c. 520, §10 (rp).]

3. **Hazardous waste reduction.** The State encourages reducing the generation of hazardous waste through, in addition to any toxics use and release reduction techniques employed by the facility, the application of the following techniques:

A. Recovery of toxics from production and other processes for reuse. [1989, c. 929, §7 (new).]

B. On-site recycling of hazardous waste; [1989, c. 929, §7 (new).]

C. Off-site recycling of hazardous waste; and [1991, c. 520, §10 (amd).]

C. Treatment, other than incineration, of hazardous waste to reduce volume, toxicity, or both. [1993, c. 732, Pt. A, §12 (amd).]

4. State facilities. The Commissioner of Administrative and Financial Services, in consultation with the Commissioner, shall lead the development of a pollution prevention system for state facilities by January 1, 2005, focusing on compliance with all relevant environmental regulatory and statutory requirements, improved environmental performance, reduction of toxics use and pollution prevention opportunities. [1999, c. 348, §4 (new).]

§2303. Toxics use, toxics release and hazardous waste reduction goals

The State's goals for reduction of the volume of toxics used and released and hazardous waste that is generated within the State are as follows: [1989, c. 929, §7 (new).]

1. Toxics use reduction goals. Using the amount of toxics used statewide in 1990 as a baseline figure, the statewide goals for toxics use reduction are a 40% reduction in the amount of toxic substances used in the State by January 1, 2002, a 50% reduction by January 1, 2004 and a 60% reduction by January 1, 2006. [1999, c. 348, §5 (amd).]

2. Toxics release reduction goals. Using an average of the aggregate amounts of toxics released statewide in calendar years 1990 and 1991 as a baseline figure, the goals for reducing the aggregate amount of toxics released to the environment statewide are a 40% reduction by January 1, 2002, a 50% reduction by January 1, 2004 and a 60% reduction by January 1, 2006. [1999, c. 348, §5 (amd).]

3. Hazardous waste generation minimization goals. The goals for minimizing the amount of hazardous waste generated statewide are a 40% reduction by January l, 2002, a 50% reduction by January 1, 2004 and a 60% reduction by January 1, 2006. Reductions must be based on the average generation rate in the State for the years 1987 and 1989. [1999, c. 348, §5 (amd).]

4. Establishment of unit of product. A facility must establish its own unit of product to aid the Department in accounting accurately for changes in toxics use, toxics release and hazardous waste generation due to business growth or decline. Once established and accepted by the Commissioner, a facility's unit of product remains constant from year to year. If a facility changes its products or services so that use of the previously accepted unit of product no longer accurately accounts for toxics use, toxics release and hazardous waste reductions, the facility may petition the Commissioner to change its unit of product. The Commissioner may establish guidelines to aid facilities in the establishment of unit of product. [1991, c. 520, §12 (amd).]

5. Progress evaluation report. Progress toward meeting the statewide toxics use, toxics release and hazardous waste reduction goals must be evaluated annually by the Commissioner based on

manifest data, progress reports submitted under section 2305-A, annual hazardous waste generator reports and other appropriate available information. To determine achievement of statewide reduction goals, the Commissioner may adjust the baseline figure to account for changes in the statutory or regulatory definitions of toxic substances and hazardous wastes.

The Commissioner shall report biennially on the progress toward meeting the statewide goals established in this section and the adequacy of the goals set by facilities. In evaluating the adequacy of facility goals, the Commissioner may not consider the statewide goals. The report must include a listing of all facilities subject to the requirements of this chapter, the planning status of each facility, the goals set by each facility and the progress made by each facility, excluding any information entitled to protection as confidential information or a trade secret pursuant to section 1310-B; section 2307-A, subsection 5; or Title 37-B, section 800. The report must also include, for informational purposes, summaries of the use and release of toxic and hazardous materials not subject to the provisions of this chapter for which the Department maintains informational, planning or regulatory programs. The Commissioner shall submit the report to the Joint Standing Committee of the Legislature having jurisdiction over Natural Resources matters by January 15th of each odd-numbered year. [1999, c. 348, §5 (amd).]

6. New facilities. Facilities constructed after the effective date of this chapter should be designed to minimize toxics use, toxics release and hazardous waste generation in accordance with the State's policies as set forth in section 2302 and may be evaluated on the basis of units of product for the amount of toxics used, toxics released and hazardous waste generated. New facilities that are described in section 2304-A are subject to the requirements of this chapter.

[1999, c. 348, §5 (amd).]

7. Petition. A toxics releaser may petition the Commissioner to eliminate a substance from the total volume of toxics release subject to the reductions under subsection 2 when the toxics releaser demonstrates that release of the substance does not pose an unreasonable threat to occupational health, public health or the environment.

[1999, c. 348, §5 (amd).]

§2304. Regulated community (REPEALED)

§2304-A. Regulated community

1. Plans and reports required. Owners or operators of the following facilities shall prepare Pollution Prevention (P2) plans and biennial progress reports consistent with the requirements of this chapter, unless exempted under subsection 2: [2001, c. 212, §7 (amd).]

A. Facilities subject to reporting requirements for extremely hazardous substances under the SARA, Title III, Section 312; [1999, c. 348, §7 (new).]

B. Facilities required to report under the SARA, Title III, Section 313; [1999, c. 348, §7 (new).]

C. Facilities that ship more than 2,640 pounds of hazardous waste in a calendar year.

[2001, c. 212, §7 (amd).]

2. Exemptions. The following are exempt from the planning, reporting and fee requirements of this chapter: [1999, c. 779, §§4, 5 (amd).]

A. Drinking water supply treatment facilities; [1999, c. 348, §7 (new).]

B. Municipal wastewater treatment facilities; [1999, c. 348, §7 (new).]

C. Wholesale distributors of chemicals; [1999, c. 348, §7 (new).]

D. Hazardous substance transporters; [1999, c. 348, §7 (new).]

E. Retail and wholesale distribution facilities of motor fuel, aviation fuel, heating oil or other refined petroleum products; [1999, c. 348, §7 (new).]

F. Agricultural activities; [1999, c. 348, §7 (new).]

G. Commercial hazardous waste treatment or storage facilities; [1999, c. 348, §7 (new).]

H. For purposes of the planning, reporting and fee requirements relating to hazardous waste generation only, pilot plants or pilot production units; [1999, c. 348, §7 (new).]

I. Hazardous waste transporters; [1999, c. 348, §7 (new).]

J. Hazardous waste generated as a result of remedial or corrective actions or facility closures required by law or undertaken to protect employee health and safety, public health and safety or the environment; [1999, c. 348, §7 (new).]

K. Households; [1999, c. 348, §7 (new).]

L. Zinc emissions from tire burning; [1999, c. 779, §4 (amd).]

M. Sulfuric acid emissions from burning fuel that is approved by the department; and [1999, c. 779, §4 (amd).]

N. Lamps, mercury-containing thermostats, polychlorinated biphenyl ballast and batteries defined as universal waste in 40 Code of Federal Regulations, Section 273.2. [1999, c. 779, §5 new).]

§2305. Pollution prevention plans

Owners or operators of facilities subject to the requirements of this chapter shall develop by January 1, 2000, and update at least every 2 years thereafter, Pollution Prevention (P2) plans for their own use. The board may establish rules for toxics use, toxics release and hazardous waste reduction plans to be prepared pursuant to this section. A plan must include: [1999, c. 348, §8 (amd).]

1. Management policy. A statement of facility-wide management policy regarding toxics use, toxics release and hazardous waste reduction; [1989, c. 929, §7 (new).]

2. Production unit analysis. The following information for each production unit:

A. Identification, characterization and accounting of the types and amounts of all toxics used, toxics released and hazardous wastes generated at the facility; [1999, c. 348, §8 (amd).]

B. Identification, analysis and evaluation of any appropriate technologies, procedures, processes, equipment or production changes that may be utilized by the facility to reduce the amount or toxicity of toxics used, toxics released or hazardous wastes generated by that facility, including a financial analysis of the costs and benefits of reducing the amount of toxics used, toxics released and hazardous waste generated. This portion of the plan must employ the hierarchy of reduction techniques established under section 2302; [1999, c. 348, §8 (amd).]

C. A strategy and schedule for implementing practicable reduction options for each production process utilized to meet reduction goals; [1989, c. 929, §7 (new).]

D. Identification of any reasonably available markets or recycling opportunities for hazardous waste generated by the facility; and [1989, c. 929, §7 (new).]

E. A program for maintaining records on toxics use, toxics release and hazardous waste generation rates and management costs. [1989, c. 929, §7 (new).]

2-A. Facility goals. The facility's 2-year numeric goals for reducing the aggregate amount of Extremely Hazardous Substances (EHS's) used, the aggregate amount of toxic substances released and the aggregate amount of hazardous waste generated at the facility by 2002, 2004 and 2006. The goals must be established per unit of product to account for changes in the level of production activity from year to year; [1999, c. 348, §8 (new).]

3. Internal plan approval. The signature of a senior official with management responsibility for the person or persons completing the plan; and [1999, c. 348, §8 (amd).]

4. Employee involvement, awareness and training. An employee awareness and training program consistent with the requirements of section 2306 to involve employees in toxics use, toxics release and hazardous waste reduction planning and implementation to the maximum amount feasible. [1999, c. 348, §8 (amd).]

The plan may include a description of any pollution prevention strategies implemented at the facility after 1991 and before 1998. [1999, c. 348, §8 (new).]

Owners or operators of facilities shall keep a complete copy of the plan and any backup data on the premises of that facility for at least 5 years and make the copy and data available to the Commissioner or the Commissioner's designee upon request.

[1999, c. 348, §8 (amd).]

§2305-A. Progress reports

Beginning in 2000, the owner or operator of a facility subject to the requirements of this chapter shall submit a biennial pollution prevention progress report to the Department by July 1st of every even-numbered year. The progress report may be submitted to the Department in an electronic format. A progress report must include the following:

[1999, c. 348, §9 (new).]

1. Facility goals. Each of the facility's 2-year numeric goals established in the plan. If any of the goals has been revised since the previous progress report was submitted, the report must include an explanation of the revision; [1999, c. 348, §9 (new).]

2. Progress achieved. A quantitative statement of the facility's progress toward achieving each of its 2-year goals and an identification, in absolute amounts and per unit of product, of the reduction or increase in the amount of each Extremely Hazardous Substance used, toxics released and hazardous waste generated in comparison to the previous 2 years;

[1999, c. 348, §9 (new).]

3. Method. A description of the techniques used to achieve each reduction identified pursuant to subsection 2; [1999, c. 348, §9 (new).]

4. Explanation. An explanation of why the facility's progress is greater than or less than that anticipated in the Pollution Prevention plan schedule for implementation;

[1999, c. 348, §9 (new).]

5. Employee involvement. A description of employee notification and involvement in the planning process; [1999, c. 348, §9 (new).]

6. Future pollution prevention methods. A description, for each production unit, of the pollution prevention techniques that the owner or operator of the facility intends to undertake during the next 2 years to reduce the use of Extremely Hazardous Substances, to reduce the release of toxic substances and to reduce the generation of hazardous waste and a schedule for the implementation of the techniques; [1999, c. 348, §9 (new).]

7. Certification. A written certification signed by a senior official with management responsibility for the person or persons completing the progress report, that the owner or operator of the facility has prepared a Pollution Prevention plan, and that the plan is available on site for the Department's inspection; [1999, c. 348, §9 (new).]

A progress report may exclude any information entitled to protection as confidential information or a trade secret pursuant to section 1310-B or Title 37-B, section 800.

[1999, c. 348, §9 (new).]

§2306. Employee and host municipality notification.

Six months prior to the date when a Pollution Prevention plan or update must be completed, the owner or operator of each facility shall notify all of its employees of the requirements for the plans, identify the toxic substances and hazardous wastes and production units for which plans must be

developed and involve employees in developing the Pollution Prevention plan or update, including the identification of toxics use, toxics release and hazardous waste reduction options. In a facility in which employees are represented by a labor organization, employee representatives who work at the facility and who are selected by the labor organization shall be involved in the development of the plan. In a facility in which employees are not represented by a labor organization, the employee involvement requirement must be met through employee representation on committees or groups formed to develop the plan. A description of the employee notification process and employee involvement must be included in the progress report submitted in accordance with section 2305-A. 1999, c. 348, §10 (amd).]

The owner or operator of a facility shall notify the municipal officers of the municipality in which the facility is located of the facility's pollution prevention efforts and shall provide the municipal officers with a copy of the progress report when it is submitted to the Department. [1999, c. 348, §10 (new).]

§2307. Reporting requirements (REPEALED)

§2307-A. Authority to review; modification

1. Plan summary. The Commissioner may require the owner or operator of a facility to submit a summary of the Pollution Prevention plan required under section 2305 within 60 days when: [1999, c. 348, §12 (new).]

A. A facility has not made sufficient progress in reducing toxics use, toxics release or hazardous waste generation as evidenced by the facility's progress report; or [1999, c. 348, §12 (new).]

B. A new facility has toxics use, toxics release or hazardous generation rates that are significantly greater per unit of product than in similar facilities within the same standard industrial code category. [1999, c. 348, §12 (new).]

A plan summary submitted to the Commissioner pursuant to this subsection must include the evaluation methods used, the findings and conclusions and the implementation schedule. An owner or operator may designate information in a plan summary as confidential under section 1310-B. [1999, c. 348, §12 (new).]

The Commissioner may review a plan summary, pursuant to subsection 2, and require the owner or operator of a facility to make any modifications to the plan summary necessary for compliance with this chapter. [1999, c. 348, §12 (new).]

2. Review of plan summary. In reviewing the adequacy of a plan summary, the Commissioner shall base a determination on whether the plan summary is complete and prepared in accordance with the facility goals and guidelines established pursuant to this chapter. In reviewing a plan summary, the Commissioner has the authority to require the owner or operator of the facility to provide information the Commissioner finds necessary to analyze the reviewed document. [1999, c. 348, §12 (new).]

If the Commissioner determines that a plan summary is inadequate, the Commissioner shall notify the owner or operator of the facility of the inadequacy, identifying the specific deficiencies. The

Commissioner may specify a reasonable time period of not less than 90 days within which the owner or operator of the facility must submit a modified plan summary addressing the specified deficiencies. The Commissioner may, upon request, provide technical assistance, if available, to aid the owner or operator of the facility in modifying the plan summary.

[1999, c. 348, §12 (new).]

If the Commissioner determines that a modified plan summary is inadequate, the Commissioner may either require further modification or assess fees as provided in section 2313. If a generator fails to submit a modified plan summary within the required time period, the Commissioner may assess additional fees as established in section 1319-I, subsection 2-A.

[1999, c. 348, §12 (new).]

3. Review of plan. The Commissioner shall review the Pollution Prevention plan of a facility when, in the Commissioner's judgment, the plan summary indicates significant deficiencies in the pollution prevention efforts at the facility or when the facility fails to reach any of its reduction goals by more than 25%, as indicated in the plan summary. The Commissioner may require the owner or operator of a facility to make any modifications to a pollution prevention plan necessary for compliance with this chapter. In reviewing a Pollution Prevention plan, the Commissioner has the authority to require the owner or operator of the facility to provide information the Commissioner finds necessary to analyze the reviewed document. If the Commissioner requires the owner or operator of the facility to modify a Pollution Prevention plan, the Commissioner shall allow a reasonable time period of not less than 90 days for the modifications to be made and shall consider the financial impact of the changes or modifications on the owner or operator of the facility. The owner or operator of a facility may appeal to the board a decision of the Commissioner to require the owner or operator to modify a Pollution Prevention plan under this subsection or subsection 4. [1999, c. 348, §12 (new).]

4. Municipal petition for review of plan. The Commissioner shall review the Pollution Prevention plan of a facility upon receipt of a petition to review the plan submitted by the municipal officers in the municipality in which the facility is located. The Commissioner shall make a written determination on whether the plan meets the facility goals and guidelines of this chapter and explain the reasons for the determination. If the Commissioner determines that the plan is inadequate, the Commissioner may require the owner or operator of the facility to make modifications pursuant to this section. [1999, c. 348, §12 (new).]

5. Confidentiality. Upon a satisfactory showing to the Commissioner by the owner or operator of a facility required to submit information under this chapter that a progress report or plan summary developed under this chapter, if made public, would divulge methods, processes or other information entitled to protection, the Commissioner shall hold as confidential that progress report or plan summary or a portion of that progress report or plan summary pursuant to section 1310-B.

[1999, c. 348, §12 (new).]

§2308. Cross-media pollution control

l. Prohibition. A facility subject to regulation under this chapter is prohibited from using any change in a process or material resulting in increased toxics release to meet the hazardous waste reduction goals as set forth in section 2303. [1991, c. 520, §17 (amd).]

2. Exemptions. A facility subject to regulation under this chapter may apply to the Commissioner for an exemption from subsection 1 if the owner or operator demonstrates that the change resulting in the increased toxic release results in a long-term benefit to public health and the environment that outweighs the benefits of other reduction techniques and:

A. The increase in the toxic release does not cause a violation of the facility's existing wastewater discharge or air emission license or permit limits; or

[1989, c. 929, §7 (new).]

B. If the toxics release is new to a facility's existing air or wastewater stream, or both, the facility possesses and complies with all necessary federal, state and local licenses or permits applicable for the release. [1989, c. 929, §7 (new).]

[1991, c. 520, §17 (amd).]

3. Exemption renewal. If granted, the exemption is valid for a 3-year period. Renewal of the exemption may be granted only if the toxics releaser or generator meets the criteria set forth in subsection 2. [1989, c. 929, §7 (new).]

4. Department authority. This section does not diminish the existing authority of the Department of Environmental Protection, pursuant to any laws, to establish by rule, permit, license or order, any treatment technology standards, emission or discharge limits, operation and maintenance requirements or management practices for abating, controlling or preventing a release or threat of release of hazardous substances to the environment.

[1989, c. 929, §7 (new).]

§2309. Program; powers and duties

The Toxics and Hazardous Waste Reduction Program (THWRP) is established within the Department in the Office of the Commissioner to assist toxics users, toxics releasers and hazardous waste generators to eliminate or reduce the amounts, toxicity and adverse environmental and public health effects of toxics used, toxics released and hazardous wastes generated.

[1989, c. 929, §7 (new).]

1. Data collection and dissemination. The Commissioner shall develop the necessary information base and data collection programs to establish program priorities; evaluate the progress of toxics use, toxics release and hazardous waste reduction goals; and fully inform the public of efforts made and progress achieved in reducing toxics use, toxics release and hazardous waste generation. By January 1, 2001, the Commissioner shall organize and store the information submitted to the Department in biennial progress reports in electronic form in a manner that facilitates public access including, without limitation, making the information available through the Internet. The Commissioner shall ensure the confidentiality of any information designated as confidential or a trade secret. At a minimum, the Commissioner shall ensure that the following information is readily available to the public: [1999, c. 348, §13 (amd).]

A. The statewide goals and the progress made toward meeting them;

[1999, c. 348, §13 (new).]

B. The name, location and contact information for each facility subject to the requirements of this chapter; [1999, c. 348, §13 (new).]

C. An indication of the availability of the progress report for each facility; [1999, c. 348, §13 (new).]

D. The 2-year goals established by each facility for the reduction of toxics used, toxics released and hazardous waste generated at the facility; and [1999, c. 348, §13 (new).]

E. Each facility's progress made toward meeting each of its goals. [1999, c. 348, §13 (new).]

2. Technical services. The Commissioner shall disseminate information concerning toxics use, toxics release and hazardous waste reduction through various means including publications, the Internet, seminars, model plans, recommended waste assessment procedures and lists of consultants on toxics use, toxics release and hazardous waste reduction technologies. The Commissioner shall establish a clearinghouse of technical information on best-of-class methods for toxics use reduction for each of the classes of facilities subject to the requirements of this chapter. [1999, c. 348, §13 (amd).]

3. Grant program. The Commissioner shall evaluate the need for a grant program to provide financial and technical assistance for a facility subject to this chapter. [1989, c. 929, §7 (new).]

4. Information exchange. The Commissioner may participate in existing state, federal and industrial networks of individuals and groups actively involved in toxics use, toxics release and hazardous waste reduction. Subject to available funding, the Commissioner may contract with technical information centers to assist the Department in carrying out the provisions of this chapter. [1989, c. 929, §7 (new).]

5. Production units. (REPEALED) [1991, c. 520, §18 (rp).]

5-A. Unit of product. The Commissioner may develop guidelines to aid facilities in the establishment of units of product to account for changes in business activity. A facility's selection of or change in unit of product may be reviewed by the Commissioner and rejected if it is not appropriated for the facility. If a facility fails to identify a unit of product, the Commissioner may establish a unit of product for that facility based upon a review of units of product for similar facilities in the same standard industrial code category. [1991, c. 520, §19 (new).]

6. Contracts. The Commissioner may enter into contracts to carry out the purposes of this chapter. [1989, c. 929, §7 (new).]

7. Reports. In addition to the biennial progress report submitted by the Commissioner to the Legislature under section 2303 and after public review and comment, the Commissioner shall

submit the following reports to the Joint Standing Committee of the Legislature having jurisdiction over natural resources matters: [1999, c. 348, §14 (new).]

A. By January 15, 2001, an evaluation of and recommendations for additional chemicals and classes of facilities to be added to planning and reporting requirements; [1999, c. 348, §14 (new).]

B. By January 15, 2001, an assessment of and recommendations for focusing use reduction and pollution prevention efforts on the most toxic chemicals and classes of chemicals. The Commissioner shall base the assessment on existing toxicity information, and the recommendations may include changes to chemical lists and reporting thresholds; and [1999, c. 348, §14 (new).]

C. For the preceding 2-year period, a listing of those facilities that have exceeded their goals by more than 25% and those that have failed to meet their goals by at least 25%. This report must be submitted on October 1, 2002 and every 2 years thereafter. [1999, c. 348, §14 (new).]

8. Additional facilities; planning requirements. The Commissioner may make a finding that participation by a class of facilities in toxics reduction planning pursuant to this chapter could reduce the threat to public health, safety, occupational exposure and risk to the environment. Such a finding must follow public notice and be based on the past performance of that class of facilities and the extent to which that class of facilities contributes to the total amount and overall toxicity of toxics used, toxics released or hazardous waste generated in the State or a region of the State. If the Commissioner makes such a finding, the board may by rule designate that class of facilities as subject to this chapter. Such a rule is a major substantive rule under Title 5, chapter 375, subchapter II-A. [1999, c. 348, §14 (new).]

9. Future statewide goals. By January 1, 2007, the Commissioner shall report to the Joint Standing Committee of the Legislature having jurisdiction over natural resources matters with recommendations regarding new statewide goals for reducing the amount of toxics used, toxics released and hazardous waste generated consistent with the principles of continuous improvement in environmental management. The Commissioner shall base the proposed new goals on the extent of progress achieved by facilities throughout the State, the availability of new reduction methods and the degree of risk and hazard to occupational health, public health and safety and environmental quality posed by the use or release of toxic substances in the State and by the generation of hazardous waste in the State. At the expiration of the time periods for the goals established under this subsection, the Commissioner shall repeat the process. 1999, c. 348, §14 (new).]

10. Performance recognition program. The Commissioner shall establish a biennial recognition program for facilities achieving a minimum reduction of 40%, 50% and 60% in toxics use, toxics release or hazardous waste generation by 2002, 2004 and 2006, respectively. [1999, c. 348, §14 (new).]

§2310. Toxics Reduction Advisory Committee (REPEALED)

§2311. Fees (REPEALED)

§2311-A. Fees

The Commissioner shall deposit all money received in payment of fees under this section in a separate non-lapsing account within the Maine Hazardous Waste Fund to cover expenses incurred by the Department in the administration of this chapter.

[1999, c. 348, §16 (new).]

1. Toxics users. Toxics users shall submit $100 for each Extremely Hazardous Substance (EHS) reported by the facility under this chapter to the Department annually by October 1st.

[2001, c. 212, §8 (amd).]

2. Toxics releasers. Toxics releasers shall submit $100 for each toxic substance reported by the facility under this chapter to the Department annually by October 1st.

[2001, c. 212, §8 (amd).]

3. Hazardous waste generators. Generators that ship 300 kilograms, or 661 pounds, or more of hazardous waste in a calendar year shall pay the following fees to the Department annually by October 1st: for generators that ship 2,268.0 kilograms, or 5,000 pounds, or more of hazardous waste in a calendar year, the fee is $1,000; for generators that ship between 1,197.5 kilograms and 2,267.5 kilograms, or 2,640 pounds and 4,999 pounds, per calendar year, the fee is $500; and for generators that ship between 300 kilograms and 1,197.0 kilograms, or 661 pounds and 2,639 pounds, per calendar year, the fee is $100. Generators that ship less than 300 kilograms, or 661 pounds, of hazardous waste in a calendar year are not required to pay fees under this section.

[2001, c. 212, §8 (amd).]

4. Fee limitation. A facility subject to fees under this section may not be assessed more than $1,000 per year. [1999, c. 348, §16 (new).]

§2312. Enforcement; penalties (REPEALED)

§2313. Penalties

1. **General.** The owner or operator of a facility subject to the requirements of this chapter that fails to meet any requirement of this chapter is subject to penalties under section 349 and, as applicable, fees assessed under section 1319-I, subsection 2-A.

   [1999, c. 348, §18 (new).]

2. **Trade secrets; unlawful disclosure.** It is unlawful to disclose any information designated as confidential or a trade secret under this chapter to an unauthorized person. A person who violates this subsection is subject to the penalties specified in section 1310-B, subsection 6. [1999, c. 348, §18 (new).]